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RNA interference-mediated silencing of the *Hsp*70 gene inhibits human gastric cancer cell growth and induces apoptosis in vitro and in vivo

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ABSTRACT

Aims and background. The role of heat shock protein (HSP) 70 in gastric cancer has been extensively examined in many studies for the past decade. It has been demonstrated that over-expression of Hsp70 might play important role in malignant transformation and maintenance of malignant phenotypes. Therefore, silencing the *Hsp*70 gene could be applicable in molecular therapies of human gastric cancer. Herein, we designed a small interfering RNA targeting *Hsp*70 to knock down its expression and investigated its effect on cell proliferation and apoptosis in a gastric cancer cell line.

Methods. Two plasmids (phsp1-siRNA, phsp2-siRNA), along with a negative control (phsp3-siRNA), were created using a genic recombination technique. BGC823 cell lines were used to perform experiments. Western blotting and RT-PCR were used to detect *Hsp*70 expression *in vitro* and *in vivo*. Cell morphology was observed under light microscope. Cell cycle and apoptosis were analyzed by flow cytometry and acridine orange/ethidium bromide double stain, and cell proliferative activity was measured by alamarblue assay. In all experiments, a negative control served as a baseline measure.

Results. We successfully constructed phsps-siRNA plasmids and transfected them into BGC823 cells. RT-PCR and western blotting revealed that the expression of *Hsp*70 was down-regulated in transfection groups compared with the control group. Flow cytometric analysis indicated that less S-phase fraction accumulated in small interfering RNA transfected cells than in parental cells and the cells transfected with empty vector.

Conclusions. Our results demonstrated that RNAi against *Hsp*70 could effectively knock down gene expression, inhibit growth of cancer cells, induce cell cycle arrest and increase cell apoptosis *in vitro* and *in vivo*. *Hsp*70 might serve as a therapeutic target for human gastric cancer.

Key words: *apoptosis, cell proliferation, gastric cancer, heat shock protein 70, RNA interference.*

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